

Bonner zoologische Beiträge	Band 55 (2006)	Heft 1	Seiten 1–8	Bonn, Januar 2007
-----------------------------	----------------	--------	------------	-------------------

## A Critical Checklist of the Ants of Mongolia (Hymenoptera: Formicidae)

Martin PFEIFFER<sup>1)</sup>, Roland SCHULTZ<sup>2)</sup>, Alexander RADCHENKO<sup>3)</sup>, Seiki YAMANE<sup>4)</sup>,  
Michal WOYCIECHOWSKI<sup>5)</sup>, Aibek ULYKPAN<sup>6)</sup> & Bernhard SEIFERT<sup>7)</sup>

<sup>1)</sup>University of Ulm, Ulm, Germany

<sup>2)</sup>Ernst-Moritz-Arndt-University, Greifswald, Germany

<sup>3)</sup>Museum and Institut of Zoology PAS, Warsaw, Poland

<sup>4)</sup>Kagoshima University, Kagoshima, Japan

<sup>5)</sup>Jagiellonian University, Krakow, Poland

<sup>6)</sup>Mongolian National University, Mongolia

<sup>7)</sup>Staatliches Museum für Naturkunde Görlitz, Görlitz, Germany

**Abstract.** Here we present a critical species list of the ants of Mongolia, that is based on current literature, previously unpublished taxonomic changes, the unpublished records of the zoological expeditions of Japanese-Mongolian and German-Mongolian teams in the years 1997, 1999 and 2003 and the results of a four year Polish-German-Mongolian cooperation. We report on 68 species of 17 genera of ants that have been found within Mongolia: *Camponotus*, *Cardiocondyla*, *Cataglyphis*, *Crematogaster*, *Dolichoderus*, *Formica*, *Harpagoxenus*, *Lasius*, *Leptothorax*, *Messor*, *Myrmica*, *Plagiolipsis*, *Polyergus*, *Proformica*, *Tapinoma*, *Temnothorax* and *Tetramorium*. Six species are new to Mongolia: *Formica presilabris* Nylander, 1846, *Lasius gebaueri* Seifert, 1992, *Myrmica commarginata* Ruzsky, 1905, *Myrmica kamtschatica* Kupyanskaya, 1986, *Myrmica eidmanni* Menozzi, 1930 and *Myrmica taediosa* (Bolton, 1995).

**Keywords.** Asia, Mongolia, Formicidae, species list.

### 1. INTRODUCTION

Mongolia occupies several natural zones where the Siberian taiga forest meets the Central Asian steppe and the Gobi desert. Steep gradients of temperature and moisture show opposing trends and run contrary from North to South resulting in a vegetation sequence of forest, steppe, semi desert and desert that is considerably influenced by different soil conditions and altitudinal changes. This complex set of parameters, together with the large area of the country, creates a large variety of habitats and has a distinct influence on the biodiversity of the region (EMELJANOV & KERZHNER 1983; WALTER 1983; BRECKLE et al. 1994). Ants are a dominant part of the ground-dwelling Mongolian entomofauna, and form distinct communities in the different biomes and vegetation zones of this country (PFEIFFER et al. 2003).

The ant fauna of Central Asia has been studied for more than a century (e.g., MOCSÁRY & SZÉPLIGETI 1901), however, either these early expeditions did not occur on the territory of today's Mongolia (RUZSKY 1905; STITZ 1934; YASUMATSU 1940), or other authors had caste doubt on the validity of the determinations (e.g., DLUSSKY 1965 on RUZSKY 1915, and PISARSKI 1969a on FOREL 1904 and MOCSÁRY & SZÉPLIGETI 1901). Basic information on the

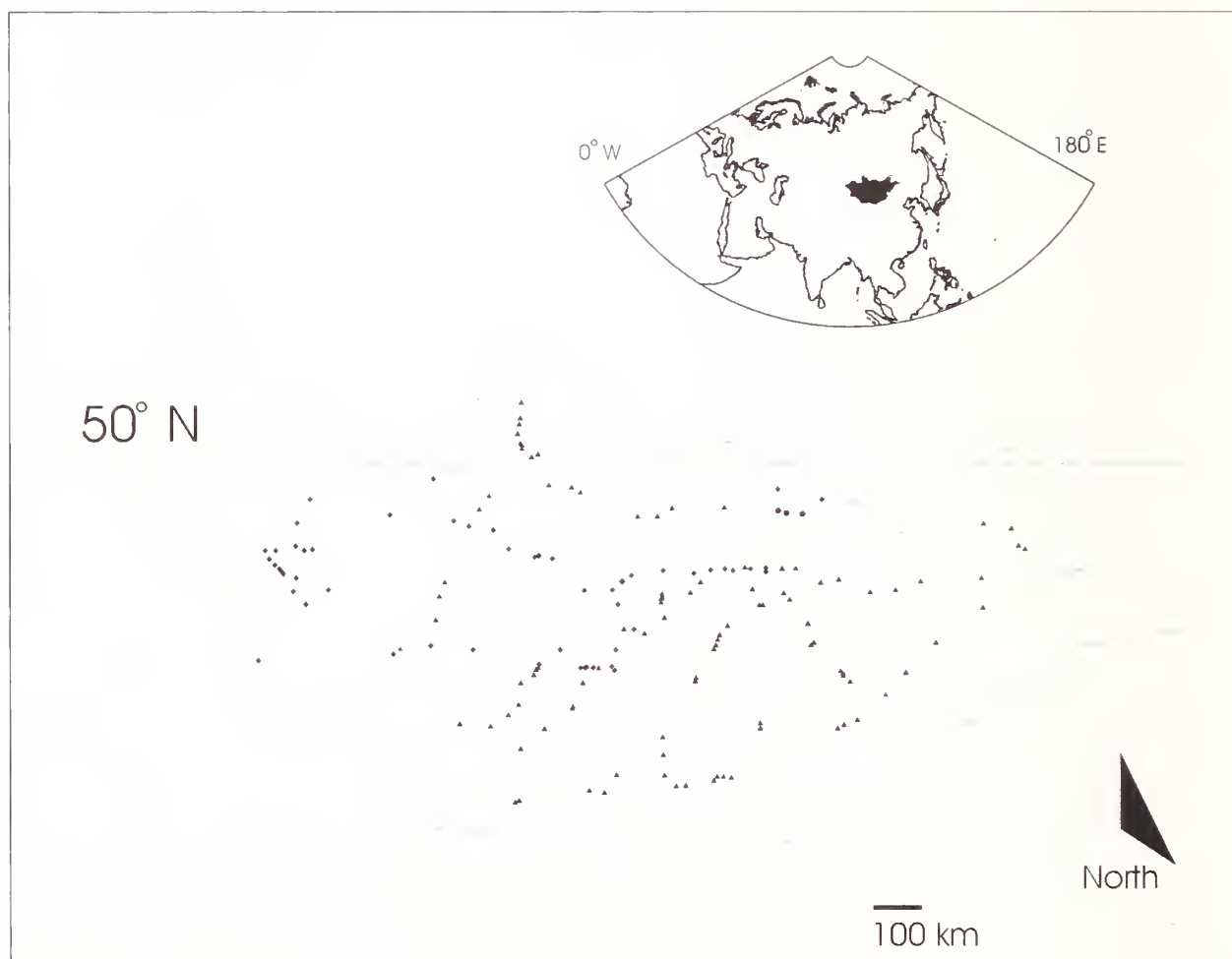
Mongolian ant fauna has been gathered by the Hungarian entomologist Dr. Z. KASZAB, whose collections from the 1960s were identified by DLUSSKY (1965), DLUSSKY & PISARSKI (1970), PISARSKI (1969 a,b) and PISARSKI & KRZYSZTOFIK (1981). DLUSSKY (1964, 1967, 1969), RADCHENKO (1994b,c, 1995a, 1997a, 2005) and SEIFERT (2000, 2003, 2004) provided additional information on the ant species composition of the Mongolian fauna and were focused to the taxonomic editing of the species (for details see below). PFEIFFER et al. (2003, 2004) obtained the first ecological research data that revealed the biogeographical patterns of the Mongolian ant fauna. Here we present a preliminary checklist of the ants of Mongolia based on a critical evaluation of older literature and on the results of our own expeditions.

### 2. MATERIALS AND METHODS

Our study is based on altogether 2145 samples from 174 locations that were accumulated in Mongolia between 1997 and 2004 (Fig. 1). We collected ant specimens during several expeditions to the Gobi desert and the steppe and forest zones of this country. Additionally several hundred specimens of other collections were taxonomically evaluated by A. Radchenko and B. Seifert.

Three German Mongolian expeditions were conducted by M. Pfeiffer and K. Ulykpan: the first together with L. Chimedregdzen from July to September 1997, the second in July/August 1999 and the third together with A. Ulykpan in July/August 2003. They collected 703 samples mostly from baits at 67 locations in 1997 and 1999, including 11 sites that have been sampled most intensively (see PFEIFFER et al. 2003), and about 200 samples of a larger investigation at altogether 37 locations in 2003. All specimens were collected from several North-South transects between E95° and E118° longitude all over Mongolia. M. Woyciechowski collected 262 samples from *Myrmica* nests within four years (1999, 2000, 2001, and 2002) in the forest steppe zone in the Hentii region (North Mongolia). Ants from nests were collected in all types of vegetation (MÜHLENBERG et al. 2000) around and between three main locations stretched across ca 100 km along the 49<sup>th</sup> parallel: Honin Nuga Research Station (N49°04'48", E107°17'15"), Hot springs (N49°01'08", E107°32'43") and Ming River valley (N49°00'06", E108°02'36"). The

Japanese-Mongolian expedition of Sk. Yamane and A. Ulykpan accumulated 2200 ant specimens from 233 samples from colonies and general collection that were sampled in June and July 2003, in Bogd Han National Park, Hustai N.P., and Terelj N.P. (all Tuv aimag); in Zamyn uud (Dornogovi aimag) and in July 2004 in Bogd Han N.P.; in Honin Nuga, and in Han Hentii Mts. (Selenge aimag). R. Schultz sampled the western part of Mongolia in July and August 2003 on an expedition from Ulaanbaatar through Hangai Mts. to Hovd and the Mongolian Altai (Hovd aimag) and examined 255 nest samples collected from 47 sites. He added more data to our list by the evaluation of 1) the collection of the University of Halle (77 samples from 7 locations), which was mainly due to the work of Mrs. Dr. A. Stubbe and 2) of the diploma thesis of A.-L. Lucau (2004), who collected 145 samples of the same three sites that had also been collected by M. Woyciechowski (Honin Nuga Research Station, Hot springs and Ming River valley) and was supervised by Prof. Dr. M. Mühlénberg, University of Göttingen.



**Fig. 1.** Map of Mongolia. Given are the positions of our sample sites. The world map in the upper right corner shows the geographical position of Mongolia (black) in the centre of Asia.

If not explicitly stated otherwise, the material that we have collected during these journeys was identified by Alexander Radchenko (genera *Camponotus*, *Cataglyphis*, *Crematogaster*, *Messor*, *Myrmica*, *Plagiolepis*, *Proformica* and *Temnothorax*), Bernhard Seifert (genera *Cardiocradylula*, *Formica*, *Lasius* and *Polyergus*), Graham-W. Elmes (*Myrmica*) and the other authors. Collection details and localities for all species will be given in future publications, in which we plan to map the distribution patterns of the main species.

To compile the species list we compared our data with that in the literature (see Table 1 and references). These references were critically scrutinized by our taxonomic experts (B. Seifert, A. Radchenko) and the validity of the nomenclature was checked by evaluating the latest taxonomic publications (BOLTON 1995, 2003; RADCHENKO 1994a,b, 1995b,c, 1997a,b; RADCHENKO et al. 2002; SEIFERT 1992, 2000, 2003, 2004).

### 3. RESULTS

The resulting list of the Mongolian fauna comprises 68 species of ants of 17 genera (Table 1). After cross checking of literature we conclude that six species are new to the Mongolian fauna (R. Schultz, Sk. Yamane & M. Woyciechowski, unpubl. results):

#### *Formica pressilabris* Nylander, 1846

Hangai mountain region, Arhangai aimag (province), Tsetserleg soum, ca. 12 km west of Tsetserleg, 1886 m, leg. R. Schultz, 02.08.2003, det. B. Seifert.

#### *Lasius gebaueri* Seifert, 1992

Tuv aimag: Bogd Han N.P., 1550 m, leg. Sk. Yamane, 27.06.2003, det. B. Seifert.

Mongolian Altay, Hovd aimag, ca. 8 km south of Hovd, ca. 20 km west of Hovd, 2021 m, leg. R. Schultz, 08.08.2003, det. B. Seifert.

#### *Myrmica commarginata* Ruzsky, 1905

Hovd aimag, Durgun soum, Chonoharaihin gol, Derris, 1154 m, leg. A. Stubbe, 27.08.2003, det. R. Schultz & A. Radchenko.

#### *Myrmica eidmanni* Menozzi, 1930

Selenge aimag, western Han Hentii Mts, 3 km SW from Honin Nuga Research Station, near Eruu River (N49°03.81', E107°16.14'), 930 m, 06.08.1999 and 8 km E from Honin Nuga Research Station, near Sharlan River (N48°57.70', E107°04.26'), 970 m, 23.07.2000, both leg. M. Woyciechowski, det. G. W. Elmes & A. Radchenko.

Selenge aimag, western Han Hentii Mts, Sharlan River, near Honin Nuga research station, 1000 m, leg. A.-L. Lucan, July 2001, det. A. Radchenko.

Selenge aimag, western Han Hentii Mts, Sharlan River, near Honin Nuga research station, leg. Sk. Yamane, July 2004, det. Sk. Yamane.

#### *Myrmica kamtschatica* Kupyanskaya, 1986

Selenge aimag, western Han Hentii Mts, 8 km E from Honin Nuga Research Station, near Sharlan River (N48°57.70', E107°04.26'), 970 m, leg. M. Woyciechowski, 23.07.2000 and the same location on 6.07.2001, det. G. W. Elmes & A. Radchenko.

#### *Myrmica taediosa* (Bolton, 1995)

Selenge aimag, western Han Hentii Mts, 9 km SW from Honin Nuga Research Station, near Eruu River (N49°02.39', E107°11.62'), 1045 m, leg. M. Woyciechowski, 28.07.2002, det. G. W. Elmes & A. Radchenko.

Due to taxonomic changes and to our critical evaluation of the species lists that have been previously published, this first comprehensive list of the Mongolian ant fauna contains a changed species spectrum compared to the older literature. For example *Lasius alienus* (Förster, 1850) has been reported from Mongolia in four publications (DLUSSKY & PISARSKI 1970; PISARSKI 1969a,b; PISARSKI & KRZYSZTOFIK 1981), however, regarding to SEIFERT (1992), this species is constricted to Europe, so the taxonomic position of these samples was doubtful. A rechecking of these specimens that had been collected by Kaszab and are housed in the Hungarian National Museum showed that they were most possibly specimens of *Lasius* cf. *obscuratus*, but definitively not of *Lasius alienus* (Sándor Csösz, Budapest, pers. comm. 2005). *Lasius* cf. *obscuratus* has been also sampled by PFEIFFER (2003) but due to the low number of specimens this determination is still uncertain and needs to be confirmed.

Other records that have been previously published are also uncertain and may be a result of misidentifications (unpublished results A. Radchenko): e.g., *Camponotus herculeanus herculeanus* Linnaeus, 1758 (in DLUSSKY & PISARSKI 1970), *Cardiocradylula stambuloffi* Forel, 1892 (in PISARSKI 1969b; PISARSKI & KRZYSZTOFIK 1981, but see RADCHENKO 1995c and SEIFERT 2003), *Myrmica bergi* Ruzsky 1902 that was confirmed to be *Myrmica divergens* Karavaiev, 1931 (in PFEIFFER et al. 2003, but see RADCHENKO et al. 2002), *Myrmica saposhnikovii* Ruzsky, 1903 (in PISARSKI 1969a,b, PISARSKI & KRZYSZTOFIK 1981), that was proved to be *M. pisarskii* Radchenko, 1994 (see RADCHENKO 1994b, 1995b), and *Myrmica schencki* Viereck, 1903 (in PISARSKI & KRZYSZTOFIK 1981), which



**Table 1.** A critical list of the ant species that have been found in Mongolia, according to literature, to our expeditions and the expertise of our taxonomic experts A. Radchenko and B. Seifert. a = STITZ (1934), b = HOLGERSEN (1943), c = DLUSSKY & PISARSKI (1970), d = DLUSSKY 1965, e = PISARSKI (1969a), f = PISARSKI (1969b), g = PISARSKI & KRZYSZTOFIK (1981), h = RADCHENKO (1994b), j = RADCHENKO (1994c), k = RADCHENKO (1995a), l = BOLTON (1995), m = German-Mongolian expedition 1997; 1999 (collection M. Pfeiffer, unpublished), n = collection of Kawaguchi, o = Radchenko (1997a), p = Dubatolov (1998), q = collection of M. Woyciechowski (1999–2004), r = collection of R. Schultz (leg. A.-L. Lucau 2001, 2003), s = collection of R. Schultz (leg. University of Halle, Germany), t = Imai et al. (2003), u = Pfeiffer et al. (2003), v = German-Mongolian expedition 2003 (M. Pfeiffer), w = German-Mongolian expedition 2003 (R. Schultz), x = SEIFERT 2003, y = Japanese-Mongolian expedition 2003 (Sk. Yamane), z = Japanese-Mongolian expedition 2004 (Sk. Yamane), 1 = SEIFERT (2004), 2 = RADCHENKO (2005), 3 = Personal collection A. Ulykpan. Valid scientific names were obtained from BOLTON 1995, 2003; RADCHENKO 1994 a,b, 1995b,c, 1997 a,b; RADCHENKO et al. 2002 and SEIFERT 2000, 2003, 2004.

Scientific name	References
<i>Camponotus japonicus</i> Mayr, 1866	b,c,c,f,g,s,y,z,3
<i>Camponotus herculeanus sachalinensis</i> Forel, 1904	c,e,f,g,w,y,z,3
<i>Camponotus saxatilis</i> Ruzsky, 1895	m,o,w,z
<i>Camponotus turkestanus</i> André, 1882	f,g,s,u,v
<i>Cardiocondyla koshewnikovi</i> Ruzsky, 1902	u,w,x
<i>Cataglyphis aenescens</i> (Nylander, 1849)	c,e,f,g,s,u,v,w
<i>Crematogaster subdentata</i> Mayr, 1877	g,u
<i>Dolichoderus sibiricus</i> Emery, 1889	2
<i>Formica aquilonia</i> Yarrow, 1955	c,n,v,y, z
<i>Formica caudida</i> Smith, 1878	c,d,e,f,g,n,r,s,u,v,w,y,z,1,3
<i>Formica clara</i> Forel, 1886	c,f,u,v,y
<i>Formica clarissima</i> Emery, 1925	s,u,w
<i>Formica cunicularia</i> Latreille, 1798	c,f,g,3
<i>Formica exsecta</i> Nylander, 1846	d,m,w,y,z
<i>Formica forsslundi</i> Lohmander, 1949	c,e,f,g,w,3
<i>Formica japonica</i> Motschoulsky, 1866	t
<i>Formica kozlovi</i> Dlussky, 1965	d,e,f,g,m,w,y,3
<i>Formica lemni</i> Bondroit, 1917	c,d,f,g,m,w,y,z,3
<i>Formica lugubris</i> Zetterstedt, 1838	f,w,y z
<i>Formica manchu</i> Wheeler, 1929	c,d,e,f,g,l,m,n,s,w,y,z,3
<i>Formica pisarskii</i> Dlussky, 1964	d,e,f,g,v,w,y,3
<i>Formica pratensis</i> Retzius, 1783	c,d,f,s,3
<i>Formica pressilabris</i> Nylander, 1846	w
<i>Formica sanguinea</i> Latreille, 1798	c,d,e,f,g,s,u,y,z,3
<i>Formica truncorum</i> Fabricius, 1804	c,d,f,3
<i>Formica uralensis</i> Ruzsky, 1895	c,d,e,f,g,u,w,y,3
<i>Harpagoxenus zaisanicus</i> Pisarski, 1963 <sup>1</sup>	c,f,g,3
<i>Lasius distinguendus</i> (Emery, 1916)	e,f,3
<i>Lasius flavus</i> (Fabricius, 1781)	b
<i>Lasius gebaueri</i> Seifert, 1992	w,y,z,3
<i>Lasius niger</i> (Linnaeus, 1758)	b,c,f,g
<i>Lasius przewalskii</i> Ruzsky, 1915	g,w,y,z,3
<i>Leptothorax acervorum</i> (Fabricius, 1793)	e,f,g,w,3
<i>Leptothorax muscorum</i> (Nylander, 1846)	c,e,f,g,y,3
<i>Messor aciculatus</i> (Smith, 1874)	e,f,u,y
<i>Messor excursionis</i> Ruzsky, 1905	g
<i>Myrmica angulirostris</i> Ruzsky, 1905	c,e,f,g,r,w,q,y,z,3
<i>Myrmica arnoldii</i> Dlussky, 1963	c,e,g,r,q,y,z,3
<i>Myrmica commarginata</i> Ruzsky, 1905	s
<i>Myrmica divergens</i> Karavaiev, 1931	c,e,g,w,q,y,z,3
<i>Myrmica eidmanni</i> Menozzi, 1930	q,r,z

<i>Myrmica forcipata</i> Karavaiev, 1931	e,f,g,r,w,q,3
<i>Myrmica kamtschatica</i> Kupyanskaya, 1986	q
<i>Myrmica kasczenkoi</i> Ruzsky, 1905	c,e,f,g,v,w,y,3
<i>Myrmica koreana</i> Elmes, Radchenko & Kim 2001	u,q
<i>Myrmica pisarskii</i> Radchenko, 1994	h,s,u,w,q,y,3
<i>Myrmica rubra</i> (Linnaeus, 1758)	b,k
<i>Myrmica ruginodis</i> Nylander, 1846	k,q
<i>Myrmica sulcinodis</i> Nylander, 1846	e,f,r,q,3
<i>Myrmica taediosa</i> Bolton, 1995	q
<i>Plagiolepis manczshurica</i> Ruzsky, 1905	e,f,g,u
<i>Polyergus nigerrimus</i> Marikovskiy, 1963	p,u
<i>Proformica buddhaensis</i> Ruzsky, 1915	f,g,u
<i>Proformica coriacea</i> Kuznetsov-Ugamsky, 1927	f
<i>Proformica jacoti</i> (Wheeler, 1923)	g,w
<i>Proformica kaszabi</i> Dlussky, 1969	u
<i>Proformica mongolica</i> (Emery, 1901)	c,e,f,g,u,w
<i>Tapinoma orthocephalum</i> Stitz, 1934 <sup>2</sup>	a
<i>Tapinoma sinense</i> Emery, 1925	j
<i>Temnothorax kaszabi</i> (Pisarski, 1969)	f,g,3
<i>Temnothorax melleus</i> (Forel, 1904)	f
<i>Temnothorax mongolicus</i> (Pisarski, 1969)	f,u,v,z
<i>Temnothorax nassonowi</i> (Ruzsky, 1895)	e,f,g,u,y
<i>Temnothorax servicus</i> (Ruzsky, 1902)	c,e
<i>Tetramorium armatum</i> Santschi, 1927	g,u
<i>Tetramorium concaviceps</i> Bursakov, 1984	u
<i>Tetramorium inerme</i> Mayr, 1877	f,u
<i>Tetramorium tsushimae</i> Emery, 1925	c,e,f,g,u,w,y

<sup>1</sup> This species is on the red list of Mongolia (<http://www.redlist.org>).

<sup>2</sup> This species has been reported from South Mongolia, but it is unclear whether this place is now in the Peoples Republic of China.

in fact is *M. koreana* Elmes, Radchenko & Kim 2001. Other mistakes seem to be most probably *T. caespitum* Linnaeus, 1758 (in DLUSKY & PISARSKI 1970; PISARSKI 1969b), that may be *Tetramorium tsushimae* Emery, 1925 and also *Tetramorium ferox* Ruzsky, 1903 (in PISARSKI & KRZYSZTOFIK 1981). Similarly, DLUSKY & PISARSKI (1970) and PISARSKI (1969b) reported about *Formica polyctena* Förster, 1850 to occur in Mongolia's forest steppe, however, this seems to be a misidentification of specimens of *Formica aquilonia* Yarrow, 1955 (B. Seifert, pers. obs.). Because of the cold winter the occurrence of *F. polyctena* within Mongolia should be impossible. We excluded all suspicious records from our species list.

Due to the failure to access type material of *Formica subpilosa ruzskyi* Dlussky 1965, only indirect assessment of the status of this taxon is possible. Most certainly this taxon is conspecific with *F. clarissima* Emery, 1925 because any material known from Mongolia and Tibet seems to belong to one and the same species according to structur-

al characters. Furthermore there is no indication that those pigmentation characters proposed by the DLUSKY (1965) for the differentiation of the *Formica subpilosa* subspecies *pamirica* Dlussky 1965, *clarissima* Emery 1925 (to which Dlussky applied the unnecessary replacement name *ruzskyi* Dlussky 1965) or *litoralis* Kuznetsov-Ugamsky 1926 could have any practical value. However, structural characters such as body morphometrics or setae counts computed in a discriminant analysis allow the separation of four Asian allospecies *Formica subpilosa* Ruzsky 1902, *F. clarissima* Emery 1925, *F. litoralis* Kuznetsov-Ugamsky 1926 and *F. pamirica* Dlussky 1965 (B. Seifert, unpubl. data). According to the material investigated by us only *F. clarissima* Emery 1925 could be confirmed for Mongolia. The possible occurrence of *F. subpilosa* in semideserts of S Mongolia, as extension of the population from Chinese Gobi desert, should be checked during further field studies. Similarly *Cataglyphis aenescens roickingeri* and *C. aenescens tankrei* have been synonymized with *C. aenescens* (Nylander, 1846) (RADCHENKO 1997b).

**Table 2.** Valid names of Mongolian ants and their former names or junior synonymies that have been used in the older literature.

Valid name	Former name
<i>Cataglyphis aenescens</i> (Nylander, 1846)	<i>Cataglyphis aenescens roickingeri</i> For <i>C. aenescens tankrei</i> For <i>F. longiceps</i> Dlussky, 1964
<i>Formica manclui</i> Wheeler, 1929	
<i>F. dluskyi</i> Bolton, 1995	
<i>Formica candida</i> Smith, 1878	<i>F. picea</i> Nylander, 1846, sensu DLUSKY 1967; sensu DLUSKY & PISARSKI 1971, and other authors <i>F. transcaucasica</i> Nasonov, 1889, sensu COLLINGWOOD 1979, and other authors <i>Leptothorax kaszabi</i> Pisarski, 1969 <i>Leptothorax melleus</i> Forel, 1904 <i>Leptothorax melleus csikii</i> Pisarski, 1969 <i>Leptothorax mongolicus</i> Pisarski, 1969 <i>Leptothorax servicus mongolicus</i> Pisarski, 1969 <i>Leptothorax nassanovi</i> Ruzsky, 1895 <i>Leptothorax servicus</i> Ruzsky, 1902 <i>Tetramorium annectens</i> Pisarski, 1969 <i>Tetramorium jacoti</i> Wheeler, 1927
<i>Temnothorax kaszabi</i> (Pisarski, 1969)	
<i>Temnothorax melleus</i> (Forel, 1904)	
<i>Temnothorax mongolicus</i> (Pisarski, 1969)	
<i>Temnothorax nassanovi</i> (Ruzsky, 1895)	
<i>Temnothorax servicus</i> (Ruzsky, 1902)	
<i>Tetramorium tsushimae</i> Emery, 1925	

In several cases the names of the species have been changed since that time when DLUSKY and PISARSKI identified the ant species from KASZAB's rich collection of the Mongolian fauna. For example *Formica manclui* Wheeler, 1929 was formerly named *F. longiceps* Dlussky, 1964 or *F. dluskyi* Bolton, 1995 (see SEIFERT 2000) or *T. tsushimae* Emery, 1925 formerly considered as *Tetramorium annectens* Pisarski, 1969 or *Tetramorium jacoti* Wheeler, 1927 (see BOLTON 1995). In the case of *Formica candida* Smith, 1878 this ant taxon was divided into two different species with separate zoogeography (SEIFERT 2004): the western "Black Bog Ant" redescribed as *Formica picea* Nylander, 1846, and *F. candida*, which is found in East Siberia from the eastern Altai mountains up to the Russian Far East, in Tibet, Mongolia, and North Korea. With these redescriptions the older name *Formica transcaucasica* Nasonov, 1889 that has been used for *F. candida*, e.g., in PFEIFFER et al. (2003), is invalid. Similarly some species of the genus *Leptothorax* have been transferred to the genus *Temnothorax* (e.g., *Temnothorax mongolicus* (Pisarski, 1969) or *Temnothorax nassanovi* (Ruzsky, 1895) (BOLTON 2003). We excluded all synonymies (see Table 2) from the list.

#### 4. DISCUSSION

For the first time we present a critical, tentative species list of the Mongolian Formicidae that includes all previously recorded taxa. We also added six new species, *F. pressilabris*, *L. gebaneri*, *M. commarginata*, *M. eidmanni*, *M. kamtschatica* and *M. taediosa* to the ant species list of Mongolia. Up to now the genus *Formica* provides the highest number of species (18) in this list, while *Myrmica* is represented by 14, *Lasius*, *Proformica* and *Temnotho-*

*rax* by five species, each. The large number of *Formica* and *Myrmica* ants, that dominate the northern parts of Mongolia, may be a hint towards the higher productivity of these regions (forest, steppe) compared to the semi deserts and deserts in the southern country. However, the study of the Mongolian Formicidae is still going on, and we are expecting that more species will be added to the list within the next years (e.g., social parasitic ants), because of new collections and/or changes in the taxonomic system.

**Acknowledgements.** We thank Prof. Dr. Kaman Ulykpan, Mongolian National University, Ulaanbaatar, for his kind cooperation and help during the organization of our expeditions and also for the collection of some of the ant specimens. We are in debt to Dorjiin Oldokh, Odn Odonchimeg, and to the late Dr. Losol Chimedregzen for their help during field work. We thank Ana-Lena Lucau, for the collection data of some Mongolian ant species. Prof. Dr. M. Woyciechowski's and Ana-Lena Lucau's data were collected during their stay in the Honin Nuga Research Station guided by Prof. Dr. Michael Mühlenberg, Georg-August-University, Göttingen, Germany and thanks to the financial support of Georg-August-University of Göttingen. This Station was founded thanks to the cooperation of the Georg-August-University of Göttingen and the National University of Mongolia, Ulaanbaatar. We are very grateful for this support of our study. We owe special gratitude for collection data to Assoc. Prof. Dr. Sadao Kawaguchi, Faculty of Agriculture, Kyushu University, Japan, and to Dr. Annegret Stubbe, Martin-Luther-University, Halle. We thank especially Sándor Csösz of the Hungarian National Museum for sending an actual, tentative identification of the specimens formerly described as *Lasius alienus* and Dr. G.W. Elmes for his help during the determination of *Myrmica* species. We appreciate an anonymous referee for his helpful comments on a former version of the paper. In 1999 the German-Mongolian expedition (M.P.) was generously funded by the "Arthur-von-Gwinner-Stiftung für naturwissenschaftliche Forschungsreisen".



## REFERENCES

- BOLTON, B. 1995. A new general catalogue of the ants of the world. Harvard University Press, Cambridge, Massachusetts. 504 pp.
- BOLTON, B. 2003. Synopsis and classification of Formicidae. The American Entomological Institute, Gainesville. 374 pp.
- BRECKLE, S. W., AGACHANJANZ, O. & RAHMANN, M. 1994. Spezielle Ökologie der Gemäßigten und Arktischen Zonen Euro-Nordasiens. Ökologie der Erde. Vol. 3. Gustav Fischer Verlag, Stuttgart, Jena. 726 pp.
- COLLINGWOOD, C. A. 1979. The Formicidae of Fennoscandia and Denmark. Fauna Entomologica Scandinavica 8: 1–174.
- DLUSSKY, G. M. 1964. The ants of the subgenus *Coptoformica* of the genus *Formica* of the USSR. Zoologicheskoy Zhurnal 43 (7): 1026–1040. (In Russian).
- DLUSSKY, G. M. 1965. Ants of the genus *Formica* L. of Mongolia and Northeast Tibet (Hymenoptera, Formicidae). Annales Zoologici (Warsaw) 23: 15–43.
- DLUSSKY, G. M. 1967. The ants of the genus *Formica*. Nauka, Moscow-Leningrad. 326 pp. (In Russian).
- DLUSSKY, G. M. 1969. The ants of the genus *Proformica* of the USSR and adjacent countries (Hymenoptera, Formicidae). Zoologicheskoy Zhurnal 48 (2): 218–232.
- DLUSSKY, G. M. & PISARSKI, B. 1970. Formicidae aus der Mongolei. Ergebnisse der Mongolisch-Deutschen Biologischen Expeditionen seit 1962. Mitteilungen des Zoologischen Museums Berlin 46: 85–90.
- DUBATOLOV, V. V. 1998. The black Amazon ant, *Polvergus nigerimus* (Insecta, Hymenoptera: Formicidae), a new species for the fauna of Mongolia. in: Ants and Forest Protection. Materials of the 10th All-Russian Myrmecological Symposium, Peshki, 24–28 August 1988, p. 140.
- EMELJANOV, A. F. & KERZHNER, I. M. 1983. Wichtige Besonderheiten der Entomofauna der Mongolei. MVR-Symposium, Erforschung Biologischer Ressourcen der Mongolischen Volksrepublik, Halle, Sektion Biowissenschaften Martin-Luther Universität Halle-Wittenberg und Biologische Gesellschaft der DDR. 110–113.
- FOREL, A. 1904. Note sur les fourmis du Musée Zoologique de l'Académie Impériale des Sciences à St. Pétersbourg. Ezegodnik Zoologiceskago Muzeja Imperatorskoj Akademii Nauk 8: 368–388.
- HOLGERSEN, H. 1943. Insecta, ex Sibiria meridionali et Mongolia, in itinere Orjan Olsen 1914 collecta. C. Hymenoptera. 1. Formicidae. D. Hemiptera. 1. Homoptera cicadina. Norsk Entomologisk Tidsskrift 6: 162–163.
- IMAI, H. T., KIHARA, A., KONDOH, M., KUBOTA, M., KURIBAYASHI, S., OGATA, K., ONOYAMA, K., TAYLOR, R. W., TERAYAMA, M., TSUKII, Y., YOSHIMURA, M. & UGAVA, Y. 2003. Ants of Japan. Gakken, Tokyo. 224 pp.
- LUCAU, A.-L. 2004. Der Ameisenbläuling *Maculinea teleius* und seine Wirte im Khentii, Nordmongolei. Diploma Thesis, Georg-August-Universität zu Göttingen, Göttingen. 138 pp.
- MOCŠÁRY, A. & SZÉPLIGETI, V. 1901. Hymenopteren. Pp 121–169 in: HORVATH, G. (ed.) Dritte Asiatische Forschungsreise des Grafen Eugen Zichy. Karl W. Hiersemann, Leipzig. 472 pp.
- MÜHLENBERG, M., SŁOWIK, J., SAMIYA, R., DULAMSUREN, C., GANTIGMA, C. & WOYCIECHOWSKI, M. 2000. The conservation value of West-Khentii, North Mongolia: evolution of plant and butterfly communities. Fragmenta Floristica et Geobotanica 45: 63–90.
- PFEIFFER, M., CHIMEDREGZEN, L. & ULYKPAN, K. 2003. Community organization and species richness of ants (Hymenoptera/Formicidae) in Mongolia along an ecological gradient from steppe to Gobi desert. Journal of Biogeography 30: 1921–1935.
- PFEIFFER, M., CHIMEDREGZEN, L. & ULYKPAN, K. 2004. Biodiversität und Struktur mongolischer Ameisengemeinschaften entlang eines Transektes von der Steppe bis in die Wüste Gobi. Mitteilungen der DGaE 14: 149–152.
- PISARSKI, B. 1969a. Fourmis (Hymenoptera: Formicidae) de la Mongolie. Fragmenta Faunistica 15: 221–236.
- PISARSKI, B. 1969b. Myrmicidae und Formicidae. Ergebnisse der zoologischen Untersuchungen von Dr. Z. Kaszab in der Mongolei (Hymenoptera). Faunistische Abhandlungen Dresden 2 (29): 295–316.
- PISARSKI, B. & KRZYSZTOFIK, L. 1981. Myrmicinae und Formicidae (Hymenoptera) aus der Mongolei. II. Folia entomologica Hungarica Rovartani közlemények 34 (2): 155–166.
- RADCHENKO, A. G. 1994a. A key to the identification of the genus *Leptothorax* (Hymenoptera, Formicidae) of the Central and Eastern Palaearctic. Zoologicheskoy Zhurnal 73: 146–158. (In Russian).
- RADCHENKO, A. G. 1994b. New Palaearctic species of the genus *Myrmica* Latr. (Hymenoptera, Formicidae). Memorabilia Zoologica 48: 207–217.
- RADCHENKO, A. G. 1994c. A Key for identification of the ants of South Siberia. Trudy zapovednika „Daurisky“, 3: 95–118. (In Russian).
- RADCHENKO, A. G. 1995a. A review of species of *Myrmica* belonging to the groups of *rubra*, *rugosa*, *arnoldii*, *luteola* and *schrencki* (Hymenoptera, Formicidae) from the Central and Eastern Palaearctic. Entomological Review (Washington), 1995, 74 (8): 122–132.
- RADCHENKO, A. G. 1995b. A survey of species of *Myrmica* of *lobicornis*-groups (Hymenoptera, Formicidae) from Central and Eastern Palaearctic. Entomological Review (Washington), 1995, 74 (9): 133–146.
- RADCHENKO, A. G. 1995c. Palaearctic ants of the genus *Cardicondyla* Emery (Hymenoptera, Formicidae). Entomologicheskoe obozrenie 74 (2): 447–455. (In Russian).
- RADCHENKO, A. G. 1997a. A review of the Palaearctic ants of the genus *Camponotus* (Hymenoptera, Formicidae). Subgenus *Camponotus* s. str.. Zoologicheskoy Zhurnal 76 (5): 554–564. (In Russian).
- RADCHENKO, A. G. 1997b. A review of the ants of the genus *Cataglyphis* Foerster (Hymenoptera, Formicidae) of Asia. Entomologicheskoe obozrenie 76 (2): 424–442. (In Russian).
- RADCHENKO, A. G., ELMES, G. W. & WOYCIECHOWSKI, M. 2002. An appraisal of *Myrmica bergi* Ruzsky and related species (Hymenoptera, Formicidae). Annales Zoologici 52 (2): 409–421.
- RADCHENKO, A. G. 2005. Monographic revision of the ants (Hymenoptera, Formicidae) of North Korea. Annales Zoologici 55 (2): 127–221.
- RUZSKY, M. D. 1905. The ants of Russia. Systematics, geography and data on biology of the Russian ants. Part one. Trudy obschestva estestvoispytateley pri Imperatorskom Kazanskom Universitete 38 (4–6): 1–800. (In Russian).
- RUZSKY, M. D. 1915. On the ants of Tibet and the southern Gobi. On material collected on the expedition of Colonel P. K. Kozlov. Ezegodnik Zoologiceskago Muzeja 20: 418–444. (In Russian).
- SEIFERT, B. 1992. A taxonomic revision of the Palaearctic members of the ant subgenus *Lasius* s. str. (Hymenoptera: Formi-

- cidae). Abhandlungen und Berichte des Naturkundemuseums Görlitz **66** (5): 1–66.
- SEIFERT, B. 2000. A taxonomic revision of the ant subgenus *Coptoformica* Mueller, 1923 (Hymenoptera, Formicidae). *Zoosystema* **22**: 517–568.
- SEIFERT, B. 2003. The ant genus *Cardiocondyla* (Insecta: Hymenoptera: Formicidae): A taxonomic revision of the *C. elegans*, *C. bulgarica*, *C. batesii*, *C. nuda*, *C. shuckardi*, *C. stambuloffii*, *C. wroughtonii*, *C. emeryi*, and *C. minutior* species groups. SO - Annalen des Naturhistorischen Museums in Wien Serie B Botanik und Zoologie **104B**: 203–338.
- SEIFERT, B. 2004. The „Black Bog Ant“ *Formica picea* Nylander 1846 – a species different from *Formica candida* Smith 1878 (Hymenoptera: Formicidae). *Myrmecologische Nachrichten* **6**: 29–38.
- STITZ, H. 1934. Schwedisch-chinesische wissenschaftliche Expedition nach den nordwestlichen Provinzen Chinas, unter Leitung von Dr. Sven Hedin und Prof. Sü Ping-chang. Insekten gesammelt vom schwedischen Arzt der Expedition Dr. David Hummel 1927–1930. 25. Hymenoptera. 3. Formicidae. *Arkiv för Zoologi* **27A**: 1–9.
- WALTER, H. 1983. *Vegetation of the Earth*. Springer Verlag, Berlin, Heidelberg, New York. 318 pp.
- YASUMATSU, K. 1940. Contributions to the hymenopterous fauna of Inner Mongolia and North China. *Transactions of the Sapporo Natural History Society* **16**: 90–95.
- Authors' addresses:** Martin PFEIFFER (corresponding author), Department of Experimental Ecology, University of Ulm, Albert-Einstein Allee 11, D-89069 Ulm, Germany; E-Mail: martin.pfeiffer@uni-ulm.de; Roland SCHULTZ, Zoological Institute & Museum, Ernst-Moritz-Arndt-University, Johann-Sebastian-Bach-Str. 11–12, D-17487 Greifswald, Germany; Alexander RADCHENKO, Museum and Institute of Zoology, Polish Academy of Sciences, 64, Wilcza str., 00-679, Warsaw, Poland; Seiki YAMANE, Department of Earth and Environmental Sciences, Faculty of Science, Kagoshima University, Korimoto 1, Kagoshima 890-0065, Japan; Michal WOYCIECHOWSKI, Institute of Environmental Sciences, Jagiellonian University, Gronostajowa 7, 30–387 Krakow, Poland; Aibek ULYKPAN, Mongolian National University, Department of Ecology, Ulaanbaatar 46, P.O. Box 377, Mongolia; Bernhard SEIFERT, Staatliches Museum für Naturkunde Görlitz, Am Museum 1, D-02826 Görlitz, Germany.

Received: 06.06.2005

Revised: 17.06.2005

Accepted: 01.07.2005

Corresponding editor: D. Stüning



# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Bonn zoological Bulletin - früher Bonner Zoologische Beiträge.](#)

Jahr/Year: 2007

Band/Volume: [55](#)

Autor(en)/Author(s): Pfeiffer Martin, Schultz Roland, Radchenko Alexander, Yamane Seiki, Woyciechowski Michal, Ulykpan Aibek, Seifert Bernhard

Artikel/Article: [A Critical Checklist of the Ants of Mongolia \(Hymenoptera: Formicidae\) 1-8](#)